

53 Modern Outbreaks



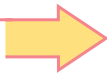
Ebola fever, Lassa fever, Hanta virus, Bolivian hemorrhagic fever, and AIDS are all examples of new infectious diseases. Some new infectious diseases are the result of new interactions between people and the environment. Many of these diseases can be traced to animal species. For example, when people go deeper into unexplored jungles, they are more likely to come into close contact with wild animals and their diseases, perhaps for the first time. In some cases, the disease passes from animal to human. Ebola is probably one such disease. Epidemiologists believe that Ebola originally may have been an infection of green monkeys in Uganda.



There is a real risk that such new diseases could quickly spread among different populations anywhere in the world. That is why the United States is prepared to send scientific teams to respond immediately to possible outbreaks of these new diseases, which are also known as **emerging diseases**.

In this activity, you will simulate the experience of a team of epidemiologists trying to trace the cause of a new disease.

CHALLENGE



How is Maracondo Fever spread? What can you do to stop it?

MATERIALS



For each group of four students

- 1 Maracondo Fever game board
- 1 set of Hut, House, Lab, and Weird Events cards
- 1 number cube
- 4 game pieces
- 1 Student Sheet 53.1, "Maracondo Fever Hypotheses"
- 1 Student Sheet 53.2, "Infected People"
- 1 Student Sheet 53.3, "Healthy People"
- 1 Student Sheet 53.4, "Additional Field Notes"

Maracondo Fever

An old man struggled out of a canoe in the tropical heat and stumbled into the town of Garrettville, collapsing in the main street. The children who found him were shocked to see that his eyes were bloodshot, his nose was bleeding, and his skin was bruised. He was immediately rushed to the hospital where he began coughing up blood. Before becoming unconscious, he told the doctors of a frightening disease affecting the people of his village, Maracondo. The old man died later that day of the same disease he had been warning the townspeople about.

None of the medical staff knew much about Maracondo (population 85), which is the last village that boats can reach as they head up the river. The medical staff of the Garrettville Hospital was worried about the spread of this mysterious disease. No one in the town became ill, but the townspeople were very frightened. They were also concerned about the people in Maracondo. The hospital doctors collected samples from the dead man, including urine, blood, and feces. They sent these samples, packed in dry ice, to the United States—to the Centers for Disease Control and Prevention (CDC) in Atlanta, Georgia. When the samples were analyzed, it appeared that the blood of the man contained an unknown virus.

The CDC worked quickly to put together an expert team to help the people of Maracondo. A doctor, an epidemiologist, a veterinarian, and an ecologist make up the team. The team's mission is to go to Maracondo to find out how this new disease is spread in order to stop more people from getting sick. If the illness is spread from person to person, it might take only one



infected person to get on a plane to accidentally start an epidemic more horrifying and deadly than the bubonic plague of the 1300s.

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You and your partners make up the expert team from the CDC. You must gather evidence to determine how this disease, now called Maracondo Fever, is transmitted. You need to do this in time to save the people of Maracondo.

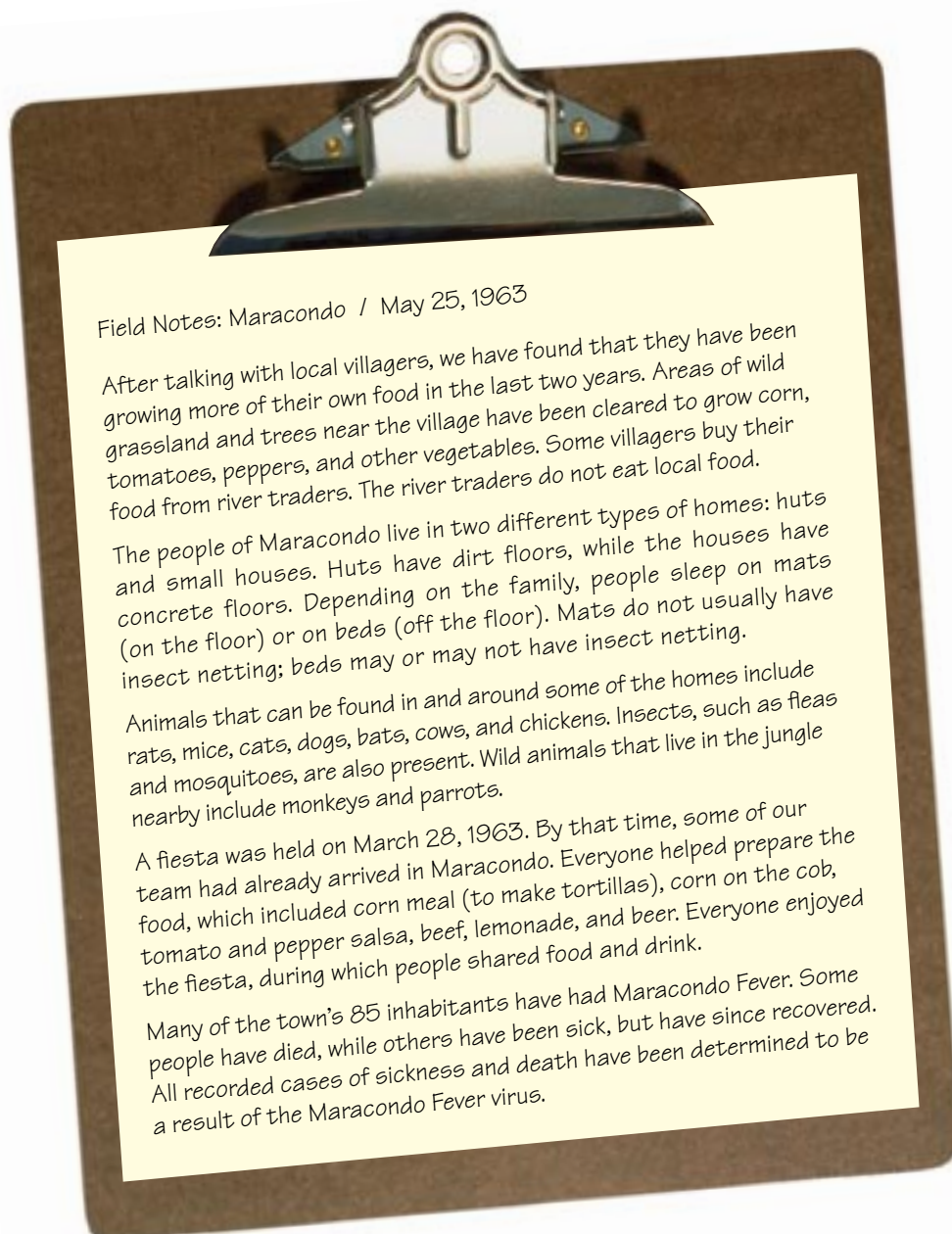
As you begin your investigation, imagine you are heading into Maracondo. You are very hot, thirsty, and irritable. People in the village are terrified and tension is high. You have no idea if the village leader who meets you has the virus in his breath, or on his hands, or if the virus is being carried by mosquitoes that are, at this very moment, buzzing around your head. In addition, you will have to live in a straw hut, sleep in a hammock, and boil all of your water.

But as a “can do” person, you get local villagers to help you set up a lab in half the normal time. You also build an animal collection center to check if any of the local animals are carrying the disease. All the people on your team are experienced microbe hunters and know that hunches are not good enough. You owe it to the villagers and the rest of the world to base your conclusions and recommendations on strong evidence.

PROCEDURE

Part A: Field Notes

1. Before arriving in Maracondo, discuss with your team the symptoms and possible causes of the disease. Brainstorm ways in which the disease may be passed around the community.
2. After arriving at Maracondo, you gather additional information. Review your field notes (below) before going on to Step 3.
3. How do you think Maracondo Fever is spread? Discuss your ideas in your group and write out your initial hypothesis on Student Sheet 53.1, "Maracondo Fever Hypotheses."



Part B: Maracondo Fever Game

4. Begin the game by placing the cards face down in four stacks: Hut, House, Lab, and Weird Events. You will pick up a card every time you land on a space. For example, if you land on a Hut, read a Hut Card. Do the same for House, Lab, and Weird Events spaces.
5. Each person begins on the Start space. Have one person from the team toss the number cube and move that number of spaces on the game board. Follow the path on the game board. Each symbol, such as a house, hut, lab, or weird event (exploding lightening) represents a space to move the game piece to.
6. Pick up and read the card. As a team, record the information you learn on
 - Student Sheet 53.2, “Infected People”
 - Student Sheet 53.3, “Healthy People”
 - Student Sheet 53.4, “Additional Field Notes”
7. As you gather more evidence, revise your hypothesis on Student Sheet 53.1, “Maracondo Fever Hypotheses.” When you have too much evidence against a hypothesis, develop another hypothesis that fits the evidence.
8. Have the next player toss the number cube and move his or her game piece. As a team, repeat Steps 6 and 7.
9. Continue playing and collecting evidence. When the first person passes the Start space, pause to have a team meeting. Discuss how you think the disease was spread in light of the new evidence you have collected. Be sure to record your revised hypothesis on Student Sheet 53.1.
10. Continue playing and collecting evidence. When the next person passes the Start space, turn over all of the remaining cards and record all of the evidence.
11. As a group, complete Analysis Questions 1 and 2.



ANALYSIS



1.
 - a. Review your data on Student Sheet 53.2. What did the people who were infected have in common?
 - b. Review your data on Student Sheet 53.3. What did the people who remained healthy have in common?
 - c. Compare the data from Student Sheet 53.2 with the data on Student Sheet 53.3. What are some of the differences between those people who became infected compared with those who stayed healthy?



2.
 - a. How do you think people are infected with Maracondo Fever? Explain how your evidence supports your final hypothesis.
 - b. *People's lives are at stake!* Identify any evidence that seems to conflict with your final hypothesis and explain how your hypothesis addresses it.



3. Now that your CDC team has discovered how this disease spreads, you must recommend ways to reduce the spread of the disease, both within and outside of Maracondo. Recall what you know about viruses, as well as the information provided in this activity. Provide at least two recommendations to stop the spread of Maracondo Fever. Support them with evidence and identify the trade-offs involved in your recommendations.

Hint: To write a complete answer, first state a recommendation. Provide two or more pieces of evidence that support your recommendation. Then consider the possible consequences of your recommendation and identify the trade-offs of your recommendation.

4. **Reflection:** What character traits and habits of mind would make a great epidemiologist?

